

The diagram illustrates a secure e-commerce system architecture. At the top, two boxes represent external entities: "POTENTIAL BUYER TERMINALS OR NODES" (labeled 44) and "POTENTIAL SELLER TERMINALS OR NODES" (labeled 40). Both are connected via lightning bolts to a central horizontal bar representing "COMMUNICATIONS LINKS: WAN, TELCO, SATELLITE, INTERNET, VPN, ETC.". Below this bar is a "SECURITY LAYER". This layer connects to a "HOST COMMUNICATIONS SERVER" (labeled 42) through a bidirectional arrow. The "HOST COMMUNICATIONS SERVER" is further connected to a "HOST DATABASE SERVER" (labeled 56) via another bidirectional arrow. The "HOST DATABASE SERVER" is connected to a "P107: SECURITY LAYER" (labeled 58) through a bidirectional arrow. This security layer connects to another horizontal bar representing "COMMUNICATIONS LINKS: WAN, TELCO, SATELLITE, INTERNET, VPN, ETC.". At the bottom, three boxes represent internal agents: "POTENTIAL BUYER'S AGENT" (labeled 50), "ENTERPRISE LAN AGENT OPTION" (labeled 48), and "POTENTIAL SELLERS AGENT" (labeled 52). These are connected via lightning bolts to the bottom communication links bar.

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SECURE SYSTEM FOR TRADING FUNGIBLE COMMODITIES

Background of the Invention

This invention relates to a secure networked communication and information management system to protect the proprietary interests of principals while providing these principals with an opportunity to anonymously and confidentially find natural counter-parties to their potential transactional interests in fungible properties. More particularly, this invention relates to a computerized networked communication and processing system wherein the identification, pairing and alerting of pre-qualified counter-parties with indications of potential transactional interest in certain fungible properties is effectuated automatically, anonymously and securely without prior disclosure of those interests.

Examining the special types of information and how they are handled and protected by the system is helpful to understanding the invention. The distinctions focus on the information generated by a principal's private investment decision and how, when, and why that information progresses from the private to public domain. A principal's proprietary interest in transacting a particular item represents that investor's desire to realize an investment objective. This information is valuable and is the property of the principal until disclosed. Special definitions of this particular information are provided below. How this special information is handled and protected by the system and why this may be important to principals is explained in later sections.

Previous systems require one or both parties to unilaterally display, divulge and/or broadcast their proprietary transactional interests in the hopes of eliciting a response from natural counter-parties. A principal's interests can be, and often are, jeopardized when the transactional interest information representing its desire to put a proprietary investment decision into action is divulged ahead of locating and contacting a qualified counter-party.

Previous systems also require a firm order to transact an item that potentially commits parties to execute a transaction before any negotiation can occur. Resulting executions without the opportunity for prior negotiations are often not in the principals' best interests and are often highly inefficient in fulfilling their investment objectives.

Unfulfilled transaction interest information has value for a number of reasons:

First, unfulfilled transactional interest information typically represents a proprietary investment idea generated through work and analysis of the principal.

Second, this interest, if divulged ahead of fulfillment, can often adversely affect the liquidity (availability and price) of the item. Generally, the larger the transactional interest and/or the less liquid of an item, the greater the probability that the unilateral exposure of transactional interest will affect its price adversely.

Third, pre-fulfillment disclosure of the identity of the principal often has an adverse impact if, for example, the principal is known to be an intelligent, large and/or aggressive investor.

Furthermore, current mechanisms whereby natural counter-parties try to find one another are far from efficient. This causes higher costs for investors and the economy as a whole (wasted time and effort, higher transaction costs, negative price impacts, missed investment opportunities, unrealized and ineffective allocations of capital). Investors and fiduciaries often withhold their transaction interests from disclosure for fear of incurring the inordinate costs due to these inefficiencies.

Investors often will not expose even a marketable order to transact unless they are assured that there is a qualified counter-side to their transactional interest. These contingent, unfulfilled transaction interests on the sideline represent a large pool of potential and desired liquidity currently unavailable to participants. Transactions that should occur do not, reducing the efficiency of capital allocation.

These latent or contingent transaction interest types can become actual orders to transact when certain specific conditions exist (anonymity, confidentiality, qualified natural counter-party identification, etc.). This system is proposed to increase the efficiency of capital allocation and provide those specific conditions whereby principals with contingent and/or latent transactional interests can more readily pursue their investment interests.

Investors need a system that affords an opportunity to anonymously and confidentially locate a natural counter-party interested in transacting the same specific investment item without either side having to disclose its proprietary transactional interest information beforehand in order to obtain such an opportunity. Furthermore, investors need a system that

does not require principals to subject themselves to the risk of having to commit to an unwanted execution in order to potentially find the other side.

A system that could efficiently, anonymously and confidentially locate and set-up communications between natural parties with counter-side interests would be helpful and therefore of interest to many investors. Furthermore, this system would ensure that all users of the system could receive alerts to a pairing of counter-side transactional interests simultaneously so that all would be treated equally by the system.

This system should make full use of recent advances in information management; communications; networking security; the Internet; The Financial Information Exchange (FIX) protocol; Virtual Private Networks; Web-based personal page publishing; data transmission encryption.

Although the disclosure is directed to an application of the present invention wherein specific fungible properties are used and the users are presented as individual investors, its scope is broader. This invention may be applied to a variety of fungible properties and the users may be any principals or groups of principals, or agents representing principals.

With this background of the invention in mind, it is an object of this invention to provide an apparatus and method that affords users who enter transactional interest indications into the system with an opportunity to securely, anonymously, and automatically pair-off with any users who have similarly entered counter-side transactional interest indications in the same item.

It is a further object of this invention to provide a secure networked communication system wherein users can enter their transactional interest in certain items into the system in an anonymous and secure manner from remote terminals.

It is an object of this invention to provide a secure information management system wherein transactional interest indications entered by users are held in a database residing on a secure server such that they remain protected and undisclosed.

It is an object of this invention to provide a secure information management system wherein the occurrence of matching counter-side interest indications (i.e., synapse or pair-off) is immediately recognized via logic processing therein.

It is an object of this invention to provide a secure information management system wherein the occurrence of a synapse leads to the simultaneous generation of messages (Alerts) specific to the users whose indications of transactional interest have paired-off at that moment, with the alert addressed only to those users.

It is an object of this invention to provide a system wherein all users are treated equally and where no one user will possess any advantage over any other user and where all processing and communications will be kept confidential at all times.

Summary of the Invention

To achieve these and other objects, there is provided a secure system for treating fungible commodities. The system has a network including a secure station and a plurality of remote user terminals having respective user identities and communicatively linked to the secure station for data transmission between the secure station and the user terminals. A memory of the secure station stores user data including the user identities, and stores transaction data in the form of multiple prospective transaction entries received from the user terminals. Each entry includes a fungible item indication and a transaction side indication identifying one of two opposing transaction sides. A search component is operatively coupled to the memory and adapted to perform a comparison of the stored entries with respect to the fungible item indications and the transaction side indications. Based on that comparison, the search component selects sets of two or more stored entries as matching entries having the same fungible item indication and together including transaction side indications identifying the opposing transaction sides. A message sending component is operatively associated with the search component and the memory. The message sending component is adapted, in response to the selection of each set of matching entries, to generate a prospective transaction message including the transaction indication and the user identity corresponding to each of the matching entries. The message sending component further is adapted to provide the prospective transaction message to the user terminals associated with the corresponding user identities, thus to facilitate an interaction among users associated with the user identities to complete a transaction involving the fungible item. A data security component is provided for restricting access to any given prospective transaction entry stored in the memory to (i) the user identity corresponding to the given entry; and (ii) the user

identities corresponding to the other entries in any of the sets of entries that includes the given entry.

The remote user terminals can be linked to the secure station for either wireless data transmission or by direct lines. In the preferred embodiments, users provide prospective transaction entries by entering fungible item indications directly, or by gaining access to a menu, from which a particular fungible item indication (code) can be selected and entered. While the most frequently used transaction side indications are "buy" and "sell," other pairs of transaction sides are contemplated, e.g., "borrow/lend."

Preferably the search component compares the entered fungible item indication codes. For a potential set of entries having the same fungible item indication, a set of matching entries is realized if the members of the potential set include at least one entry on each side of the transaction. While sets most frequently involve pairs of entries, either side of the transaction may include two or more entries.

The selection of a set of matching entries triggers the message sending component to generate and send the prospective transaction message to all matched users. Preferably the user information includes instructions that govern notification, e.g., whether a principal or agent is to be notified, instructions to other parties in the set regarding individuals to contact, and telephone numbers, e-mail addresses, or other information to facilitate contact.

In accordance with the present invention, a secure networked communication and information management system is made available by which investors can communicate their transaction interest indications anonymously and confidentially via a network connection to a central messaging/communications and database/processing server array with the purpose of anonymously and confidentially locating a potential natural counter-party to their transactional interests in certain investment items.

Only in the event of a synapse will an alert message be generated and sent. These messages are sent only to the users who have paired-off. These messages are sent in the same secure environment used for the entry of transaction interests. The contents of the alert message may vary according to the application and user options but it essentially conveys information to only the parties or agents who have been matched as follows:

1. A message indicating that a pair-off (synapse) in a certain item has occurred;
2. Pertinent details and descriptors of the particular item of transactional interest;
3. Alternative contact options (A-C), typically including a name and phone number, e-mail, fax or point-to-point network routing addresses, etc.:

A. Principal Direct: Each principal receives contact information allowing each to communicate with the counter-party;

B. Agents Representing Principals: Agents designated by principals receive parts 1 and 2 above, the client's identity, and the contact information allowing each counter-party agent to communicate with the other on the client's behalf;

C. Hybrid: Combinations of A and B above with corresponding contact information conveyed.

The System

The system is based on a network with a secure central station coupled to remote stations used by parties to enter transaction interest information and receive alerts. Use of the application and system is illustrated below using numismatic coins as the item of transactional interest.

Further examples of items where this invention could work may be found anywhere a buyer and seller of fungible item are seeking one another, e.g., financial, commodity, and derivative securities, collectibles in addition to coins such as philatelic stamps, baseball cards, wholesale goods, etc.

Each party can enter a transactional interest or indication including an item identity and side (buyer or seller). The indication can be withdrawn from the system at any time. Current price monitoring is the responsibility of each entering party. However, a party can enter price or time limits that permit automatic changes in the activation state.

Meanwhile, other parties are using the system to enter similar information. None of the individual entries is broadcast. Instead, the secure central station compares entries to find a synapse (or coincidence event) involving a buyer and a seller (or perhaps more than one of either) of the same item.

When a synapse occurs, all matched buyers and sellers (or their appointed agents) are informed simultaneously that a synapse has occurred. Up to this point, none of the parties knows the identity of the other party (or parties) involved. When a synapse occurs, the contra-parties (or their agents) are put in communication with one another. The transaction is then negotiated between the matched parties or their agents.

This invention is not a deal-making or execution system. It is an information management system allowing interested counter-parties to securely find one another without divulging their transactional interests ahead of time. Any negotiations potentially leading to a deal or execution resulting from a pair-off in the system are done away from and without the system. The system efficiently and confidentially identifies and puts natural counter-parties expressing an opposing interest in transacting a particular item together so that they can then proceed outside of the system and negotiate a mutually desired transaction.

Unlike current transaction interest location systems, this system divulges neither principal identities nor their proprietary transaction interest information as a prerequisite to potentially finding a qualified natural party with concurrent counter-side interests in transacting a specific item.

In the Drawings:

FIG. 1 is a block diagram of a system according to the invention.

FIG. 2A and 2B are block diagrams of security/communications features, and a host server array, respectively.

FIG. 3 is a block diagram of the software environment for one embodiment of the present invention.

FIGS. 4A to 4B are respective illustrations of records, fields, and database tables used in the system.

FIGS. 5A and 5B show a high-level flow chart describing operation of the present system.

FIGS. 6A to 6D comprise a flow chart describing online communication and data transfer between a host server array and remote users.

FIGS. 7A to 7C are respective top-level flow charts illustrating options by which remote users use the host server array and further illustrating the communications, processing, messaging, and alerting functions of the present system.

FIG. 8 is a schematic view of system components.

FIG. 9 is a diagram of a stock transaction indication according to the invention.

Detailed Description of the Preferred Embodiments

The preferred embodiments are more fully understood if the following definitions are kept in mind:

Transaction Interest: A principal's proprietary interest in potentially transacting (buy, sell, trade, swap, barter, etc.) a specific item to realize their particular investment objective.

Item of Transaction Interest: An identifiable object or property that may be transacted.

Transaction Interest Indication: An expression of a potential interest in transacting a certain item.

Transaction Interest Information: Details concerning the identity of the principal and the dimensions of the transaction interest, such as: side of interest (buyer/seller); item; quantity of item desired; special parameters; and contingent factors.

Special Parameters: Further limiting details concerning a transaction interest, such as pricing levels; time periods or duration of interest, etc.

Contingent Factors of Interest: Specified conditions necessary to the validity of a transaction interest, such as when a qualified counter-party is located, or with the assurance that a minimum quantity will be wanted or available at a certain price level, etc.

Order to Transact: A set of instructions from a principal directing that a transaction in a certain item be actively initiated and pursued. A transaction order may be given to an agent, or committed directly, to any number of exchange or marketplace mechanisms.

FIG. 1 is a block diagram of the primary elements of a system 40 according to the invention. In this system a host server array 42 exchanges data with a plurality of remote user

nodes or terminals 44 and 46, optionally 48-52, through data transmission typically across communications links such as telephone/data transmission lines or frequencies (schematically represented). The host communications server 42 acts as a gateway which securely interfaces the host database server 56 to a network for transmitting data via a common protocol utilized at user terminals.

The system can be connected to users over a network such as the internet; the world wide web (Web); private virtual networks; private dedicated networks; etc., which can allow a multitude of remote users to potentially access the system simultaneously. The host communications server 42 also supports secure direct line modem connections to users. Thus, a variety of user connections and modalities are implied when reference is made to the "net" or "network."

In accordance with the preferred embodiment, the host database server 42 is connected to the network. The host communications server's web server 58 publishes at least an initial first login page accessible to a prospective user. This login page permits pre-authorized users to enter their username/password combinations to gain access to a personalized user page published by the server 58. This personalized user page allows users to enter, modify, monitor, and delete indications of transaction interest.

Users gain access via communication links to the host server array by contacting the host gateway. This contact is typically established on a network by sending data packets to an electronic address associated with the host communications server. Security measures and safeguards are initiated and implemented as this initial contact is established.

FIG. 2A shows one security and communications scheme to establish protected connections for users accessing the host communications server array 42 and to protect the contents of the host database server 56. Users typically have similar security measures as those outlined for the host communications server array 42. Communications links are usually established using a secure socket layer from user site router 60 to system site router 62, or directly from user modem 64 to host modem 66.

Router connections are normally carried over a wide area network (WAN) and contain their own port identification and authentication security routines. WAN links 68 can be

established over the Web, the Internet, a private shared network, a virtual private network, or a dedicated circuit (frame relay, 56 kb leased line, ISDN, ATM, etc.). Point to point or simple TCP/IP connections will typically be established with the TCP socket access being configured for user control for security purposes. Direct modem links 64, 66 typically are established over public telephone/data lines and/or frequencies or privately leased lines.

Once a connection is established, the gateway server provides further security checks by presenting a firewall, a login routine with automatic disconnection after a certain number of unsuccessful login attempts, and anti-hacker monitoring of all unauthorized or repeated attempts to access the host database server array 56.

FIG. 2B is a block diagram illustrating in greater detail the host communications server array 42/56. A central processor unit 70 with read only memory (CPU/ROM) controls system functions and is connected along circuit board data/address bus lines 72 to a random access memory bank (RAM) 74, mass storage devices 76, communications devices 78, and I/O (input/output) interfaces 80 which control corresponding I/O devices 82 such as video monitors, keyboards, and printers.

The communications server includes routers and modems 78 used to exchange information with remote user nodes/terminals over communications links. Other communications devices and combinations may also be used to transfer data between the host communications server and remote users of the system. The host database server 56 includes the elements mentioned above for the host communications server 42. A number of standard internal network components (hub, LAN cards, Cat5 cabling, etc.) are shared by both types of servers and are used to connect the servers into the host server array 42/56.

The host server array is illustrated using dual servers for simplicity in this example; however, more than two servers can make up the host server array.

FIG. 3 illustrates the general software configuration of the host communications server array 42/56. The system functions via a network capable operating system 84 which allows for the execution of system and application level programs and processes as follows:

Communications applications 86, 88 and 90 allow encrypted data transfer with various remote user nodes/terminals, such as those referred to above. The communications

applications allow prospective buyers and sellers at the remote nodes/terminals to log onto the host system. These applications provide either a direct connection or a user specific web page wherein users can enter, modify, monitor and delete indications of transactional interest without disclosing information about these interests, or about themselves, to any other user or entity. The communications applications also allow for dynamic messaging between the host server array and various users. The communications applications further allow for users (or agents) to be alerted in the case of a pair-off event in the host database server.

The software environment can include further applications 92, 94 supporting the system's basic data management, communications, and information processing capabilities.

Commercially available and/or customized applications 96 may be included in the software environment.

A relational database (data management, storage, and retrieval) application 98 customized to this specific invention is present in the software environment to organize, monitor, reflect modifications, allow restricted access, maintain data look-up tables, search, and associate the information entered by users. This information is organized and stored on one or more mass storage devices 76 as governed by the operating system. The information is organized and stored, for example as described below in reference to FIGS. 4A to 4B.

Internal, network and external security processing applications 100, 102 and 104 are also a feature of the software environment described with all servers sharing a network operating level security load but with the majority of the external security applications running on the host communications server 42. Special hardware associated with these security applications may be used and are typically connected to the servers either through system ports or directly to the data bus.

FIGS. 4A and 4B show examples of records and fields created by the data management, storage and retrieval process and the database tables that hold these records according to the invention. Specific data fields are associated and organized into identifiable records which are themselves further associated and organized into tables. These tables are referenced for retrieving and processing the specific data items and associations needed to fulfill specific requests or routines according to the invention. The data content at each of

these levels includes, for example, the following fields for each authorized user: id, password, name, general address, phone numbers, and fax numbers). Where necessary, records and fields specific to the invention (e.g., user network routing addresses) are identified in the following discussion of the system operation.

With specific reference to FIG. 4A, user identification fields or records include a user name record 106 and a user password 108. Several fields are provided for prospective transaction entries, i.e., transaction interest information. These include an item identification field 110, a transaction side field 112, an optional price limit field 114, an optional time limit field 116, and fields 118 and 120 for an entry sequence number and user code, respectively. Several fields are provided to indicate the status of an entry, including an active field 122, a pending field 124, a suspended field 126. A field 128 is provided for indicating that an entry has been selected for a set of matching entries, and a field 30 indicates the deletion of an entry.

Fields for recording information pertaining to users include a user code field 132, a user address field 134, an instruction field 136 and a field for an agent's address if the principal involved has selected an agent for post-matching negotiations. Finally, as indicated at 140 and 142, fields are provided for routing information and, optionally, for identifying an agent.

Turning to FIG. 4B, an active database table 144 contains all prospective transaction entries that are active, either because they were entered as active without any limits or contingencies, or because any limits or contingencies are presently met or have been satisfied. Pending entries are maintained in a database table 146. A table 148 contains all entries for which a contingency has not been met or a limit or condition is not satisfied.

Database tables relating to the fungible items include an item description table 150, a table 152 for item indication codes, and a table 154 for item pricing.

Database tables relating to system users include a table 156 listing the authorized users, a table 158 containing user identification codes, a table 160 including contact information provided by the users, and a table 162 containing user alert instructions. Finally, several tables are provided for use in auditing the system, including a table 164 of login

events, an indication entry table 166 for the prospective transaction entries, a pair-off table 168 for recording the matches of entries, and a table 180 recording the deleted entries.

FIGS. 5A and 5B present a flow chart illustrating the general operation of the system.

Users enter their pre-authorized login information at 182 to gain access to the system.

The system at 184 identifies the entity trying to access the system first through hardware and then if allowed via software security checkpoints (authentication and authorization).

If identified and authorized, the user is granted access to the system at 186.

The user can choose a general area of transactional interest from a menu such as that presented here.

- I. Collectibles
- II. Securities
- III. Commodities
- IV. Merchandise
- V. Agricultural Commodities

The user also may be presented with a series of related sub-menus to seek more specific items of interest, e.g.

- I. Collectibles
 - A. Baseball cards;
 - B. Numismatic coins;
 - 1. Pennies;*
 - 2. Nickels;
 - 3. Dimes; etc.
 - a. Boston mint;
 - b. Denver mint;

- c. Philadelphia mint;
- d. San Francisco mint; etc.

C. Philatelic stamps; etc.

Searches may be multi-layered, as well. In the above illustration the specific year and grade quality of the penny of interest may be further specified.

The user at 188 enters one or more transactional interests pertaining to a particular item. Item identifying codes may be obtained from the database if not already known by the user. Point and shoot interface capabilities may also be used to find an item of interest out of a contextually specific, alphanumerically or graphically presented catalog of items of interest.

Indications of transactional interest can be entered in either of two modes: active or pending.

Pending Mode: Entered but not yet submitted to system for potential matching with other transactional interest indications;

Active Mode: Entered and submitted to system for matching.

Indications entered by users in either active or pending mode are assessed and routed at 190. Pending indications are presented on the users' interface but go no further until put into active mode by the user. Pending indications later put into active mode by the user are shown as the newly active, and then follow the same path 192 for indications originally entered in active mode.

Once submitted in or changed to the active mode, the item of interest is identified and verified in the database. The user is afforded the further protection in that the system software runs a check for duplicate indication entry. See 196, and 216 and 218 (FIG. 6B). Once the item of interest is successfully verified and checked for duplication, the new active mode indication is passed on to the next step.

Next at 198, the active mode indication is sequentially assessed and placed by the system in the appropriate state and corresponding database.

Various States for submitted Transaction Interest Indications:

Activated: Indication is eligible to pair-off with one or more counter-side indications. Time has not expired.

With Limits; Monitored. The indication is eligible, and parameters or contingent factors are currently in-line with specified limit values. The indication is dynamically monitored with respect to the parameters or conditions for suspension and/or expiration.

Without Limits; Unmonitored. Eligible with no monitoring required.

Suspended: The interest is being monitored with at least one limit out of line. Time has not expired. Parameters or conditions (contingent factors) are currently out of line with specific values. Interest is dynamically monitored for re-activation.

Expired: Former active mode indication with time that has expired. De-activated because time value is outside of specified limits. Similar to Pending mode.

Deleted: Removed from system and blotter.

The new active mode indication is checked at 200 for the presence of limit parameters, and is either routed to the monitor loop 202 in a suspended state with limits that need to be checked, or is routed to the activated indication database 204 (without limits) if there are no limits.

The activated indication database is where indications in an activated state (whether monitored for limits or unmonitored) are continuously assessed for the presence of concurrent activated counter-side indications.

All newly entered active mode indications with limit parameters are automatically routed to the monitor loop 202 to check the limit parameters against current values for those parameters. These values typically are provided to the monitor loop from internal (e.g., time clock) 203 or external (e.g., pricing) 205 real-time or batch-refreshed data sources.

Thus, all indications entered in the monitor loop 202 are repeatedly assessed according to the relationship between their limit parameters and the current values of those parameters. As their states are changed, they are placed in the corresponding database by the

system according to the current values related to their limit parameters. This process is repeated or looped, and indications are retained in or shifted to the “suspended” or the “activated with limits” states.

All activated indications with in-line limits and suspended indications (activated but with out-of-line limits) are dynamically monitored versus external variables in a monitor loop 206 and their states are changed according to current values. Newly arriving active indications with limits are immediately checked against the current limit values and are either put into an activated with limits state or remain in the suspended state for further monitoring.

Initial states and any changes to those states are dynamically reported to the user at 208 as status messages that reflect the dynamic assessments and place indications in the appropriate databases according to their states.

Use of the system is further understood in connection with Figs. 6A-6D. When a potential user from a remote terminal first establishes a connection 210 with the central station, more particularly with the host communications server, the server presents a home page or login page 212 through which the prospective user enters login information. For already established users, this includes a user identification and password. If the information is verified and the user authorized, a menu is opened at 214 to enable the user to select an item to buy or sell. The user may identify the item with the required specificity initially, or make a general category selection and proceed through several stages of increasing specificity as described above in connection with numismatic coins. In either event, once the item-identifying code is entered, the user enters further information describing the transactional interest indication, e.g., the amount of the item, side of the transaction (buy or sell), and any applicable time limits. The completed transactional interest indication is compared to transactional interests already in the database at 216 (FIG. 6B). If an identical transactional interest is found, the prospective indication is rejected as a duplicate at 218. This protects the user from inadvertently entering the same indication twice.

If no duplication is found, the proposed transactional interest is monitored as to active or pending mode, then placed in the appropriate database or segment of memory at the secure central station, as either an “active” 220 or “pending” 222 interest indication. Pending entries remain pending until the user changes the status to active.

Active indications are further checked for the existence of limits. Interest indications with no limits are stored in the activated state. Active indications having limits are stored to a monitor loop where the limits or conditions of the indication are continually monitored, i.e., compared with internally generated or externally provided parameters.

FIG. 6C illustrates the monitoring function in which two parameters are involved, one internally generated (time) and the other externally provided (market price). As a result of this monitoring, the transactional interest indication is either maintained in an active state for potential pairing with other interests; suspended, indicating that the market price is outside of the specified limits; or expired, indicating that the time is beyond the specified limits. Conditions and limits other than price can be included in the transactional interest indication, and are handled in the same manner.

As shown in FIG. 6D, interest indications that either are active without limits or active with limits that are satisfied are continuously searched, i.e., compared with other interest indications for a potential synapse or pairing. The interest indication is maintained in the active state, unless a parameter changes leading to suspension or expiration, or a pairing occurs.

A pairing triggers two simultaneous actions: a message to the users involved in the pairing, and a removal of the matched interest indications from the activated segment of memory. A record of the synapse is created and maintained in the memory.

Returning to FIG. 6A, if a prospective user's login information is not verified, either initially or upon a predetermined number of retries, the prospective user is given an inquiry (224) regarding entry as a new user. A form is provided through which the prospective new user can enter information. Acceptance of a new user further may involve a credit card validation, escrow arrangement or other initial requirements to discourage or prevent users who lack the serious interest or capacity to engage in meaningful transactions, from proceeding further.

If appropriate, a new user at 226 is presented with surety and payment forms. These services are pre-arranged and made available from vendors by the system operators. The type of surety and escrow services required depends upon the user's declared general area(s) of

interest and level of desired access. These services may be used to certify the security of the system by assuring the performance of users to each other prior to, and in the event of, a synapse event. Users may have to agree ahead of time to have a good faith deposit or earnest money automatically placed in escrow from a validated source of funds (typically a credit card) in order to access and use certain areas of the system. Users can be required to agree ahead of time to the forfeiture of the deposit in part or whole to the counter-party for failure to perform according to the rules after a synapse event.

Furthermore, in order to use the system under certain circumstances, users may have to agree ahead of time to rules that extend beyond those pertaining to the use of the actual system described herein. For example, individuals wishing to have access to the level where they can deal directly in certain items must agree in advance when registering for that level to use and pay for a clearing house function provided by an escrow agent appointed by the system operators to facilitate the payment and delivery process after a deal is consummated.

A fee for using the system may be charged at the registration point. This typically requires the user to enter credit card payment information for submission to the third party transaction processor for validation and approval. Of course, traditional financial transaction arrangements can be accommodated manually. The user is presented with an instructional page of other options and logged out if the financial arrangements are not validated.

A new user record (which includes modifications to existing records) is created at 228 with the associated user and authorization codes. The authorization code is determined when a user identifies an area of interest/level of access and is assigned when the attendant requirements are satisfied either through automatic or administrator mediated registration procedures.

The user is presented with a menu of general areas of interest organized by item type and access levels required to enter indications at 214.

The user at 230 enters a specific searchable item of interest or selects a general area of interest from the general interest menu page leading to a series of cascading menu pages terminating in a specific item of interest.

OPTION: Stage 2 Authorization: Access levels are required to enter indications for certain items of interest. These access levels are pre-assigned by the system administrator according to the various requirements listed in the user database. Authorization is either granted or denied. If granted the user is allowed to post an indication of interest. If denied the user is sent back to the home page.

FIG. 7A schematically illustrates a potential buyer and a potential seller of an item "X," each entering a transactional interest indication. Each party enters its transactional information to the host communications server, either through a direct connection as indicated at 1, or through its web page as indicated at 1A followed by a transmission of the information to the server as indicated at 2A.

When each of the interest indications has been properly received by the communications server, it is transmitted to the database server as indicated at 3. In the database server, the processing explained above leads to the entry of the transactions into the segment of memory reflecting the active status of the entries, and a comparison leads to a synapse for pairing.

As seen in FIG. 7B, a message indicating the synapse is sent from the database server to the communications server, and then simultaneously transmitted (as at 2, or 2A plus 2B) to the transacting parties. The parties, simultaneously made aware of the match and of each other, are free to contact one another to complete the transaction, as indicated at 3. Even at this stage, no one except the transacting parties is aware of the respective offers to buy/sell item "X."

With reference to FIG. 7C, if the transacting parties have designated respective agents, the synapse triggers the same message from the database server to the communications server. The communications server simultaneously transmits alerts to the buyer's agent and seller's agents, represented as step b in the figure. Each agent notifies its principal (step c), and receives instructions from its principal regarding the transaction. Finally, the agents contact one another (e, f) to complete the transaction. Again, at this stage, the nature of the transaction is known only to the transacting parties and their agents.

As an alternative to the procedure illustrated, the alert may be provided simultaneously to the transacting parties as well as their agents.

A further feature of this system concerns apportionment of the fungible commodity among several parties on the same transaction side. For example, suppose a synapse or match involves two buyers and three sellers, and that the prospective transaction entries of all parties have listed an amount of 300,000 shares, either to purchase or sell. Thus, 900,000 shares are proposed for sale, but the combined prospective purchase is for only 600,000 shares. The five parties negotiate within the confines of the lower amount on the buy side. In particular, the two buyers can each purchase 300,000 shares, while the three sellers each sell 200,000.

FIG. 8 is a schematic of the basic features of a system 10 constructed according to the present invention. The system includes a secure central station 12 including a CPU and mass data storage capacity associated with the CPU. A memory 14 of the central station, typically including a computer's internal storage and peripheral storage units such as disk drives, is preferably organized into several memory segments including a segment 16 for storing relatively permanent data, i.e., not tied to a particular prospective transaction entry, a pending segment 18 for storing pending entries, i.e., transactional interest indications provided to the system but designated "pending" by users, an active segment 20 for storing active entries, and a suspended segment 22 for storing suspended entries. The memory further includes an internal parameter segment 24 containing internally generated parameters such as time, and an external parameters segment 26 for receiving information from external sources such as a source 28 of market price information.

Memory segment 16 contains information about individual transactors, such as name, address, telephone numbers and passwords.

The various memory segments are operationally associated with one another by information management and operations programs that reside in the CPU, as indicated at 30.

A communications or I/O port 32 of the CPU governs communications with a network 34 linking remote terminals with the central station. Two of the remote terminals are indicated at 36a and 36n, with respective communications (I/O) ports 38a and 38n that communicate with port 32 according to a common communications protocol.

The system can be further understood in accordance with an example based on trading equities (securities) in large amounts such as those associated with institutional trading.

The system is based on a network with a secure central station coupled via inter/intra/direct connections to remote stations used by parties to enter transaction interest information and receive alerts. Use of the application and system is illustrated below using equity securities as the item of transactional interest for example.

Further examples of items where this invention could work may be found anywhere a buyer and seller of any given item are seeking to find one another. Such items of transaction interest may be found in real estate; wholesaling; corporate purchasing; fine art; collectibles; stamps; coins; bullion; antiques; automobiles; automobile parts, aircraft and aircraft parts, financial securities; commodities; and derivatives. The following explanation of system logic is best understood in conjunction with FIG. 9 featuring steps A-E.

THE LOGIC OF THE SYSTEM

PLEASE REFER TO DIAGRAM FOR A SIMPLE EXAMPLE USING EQUITY SECURITIES:

A. TRADER AT ACCOUNT 1 ENTERS A BUY INDICATION INTO THE SYSTEM.

1. THE INDICATION CONSISTS OF SIDE & SECURITY.

TRADERS ENTER INDICATIONS FROM THEIR TERMINALS

THE COMMUNICATIONS LINK CAN BE OF ANY VARIETY**

2. THE CENTRAL STATION IS A SECURED FACILITY
PROTECTED BY FIREWALLS, SECURE SOCKET LAYERS, & HIGH GRADE
ENCRYPTION

... NOTHING HAPPENS...UNLESS;

B. TRADER AT ACCOUNT 2 ENTERS A SELL INDICATION INTO THE
SYSTEM.

...WHEREUPON;

C. IT PAIRS OFF WITH ACCOUNT 1'S BUY INDICATION (A SYNAPSE OCCURS)...

3. SYNAPSES ARE MADE & KNOWN ONLY BY THE COMPUTER.

... THEN, & ONLY THEN, ARE THE TRANSACTION INTERESTS OF BOTH PARTIES DISCLOSED & ONLY TO THE PARTIES:

ALERTS (WITH CONTACT INFORMATION) ARE SIMULTANEOUSLY SENT ONLY TO THE PARTIES INVOLVED

4. AND THEIR AGENTS, IF AGENTS HAVE BEEN RETAINED

EACH PARTY NOW KNOWS THAT IT HAS A CONFIDENTIAL NATURAL CONTRA-SIDE TO ITS TRADING INTEREST

...HENCEFORTH,

E. THE NATURAL CONTRA-SIDES CONTACT ONE ANOTHER TO BEGIN NEGOTIATIONS...

...LEADING TO,

A COMPLETELY CONFIDENTIAL NEGOTIATED TRANSACTION BETWEEN ONLY THE HS QUALIFIED NATURALS.

NO INFORMATION CONCERNING EITHER PARTY'S INDICATION IS REVEALED UNTIL THERE IS A SYNAPSE BETWEEN QUALIFIED CONTRA-PARTIES. THEN, THE ONLY ENTITIES WHO ARE ALERTED ARE THE MATCHED ACCOUNTS (&/or THEIR DESIGNATED AGENTS.)

A MINIMUM COMMITMENT OR A GOOD FAITH DEPOSIT MAY BE REQUIRED TO ENTER THE SYSTEM. THIS IS MEANT TO KEEP INFORMATION SEEKERS OUT, TO ASSURE THAT THE OTHER SIDE IS REAL, & TO MAKE SURE THAT A REAL NEGOTIATION TAKES PLACE FOLLOWING A SYNAPSE.

Each party can enter a transactional interest or indication including item, identity and side (buyer or seller). The indication can be withdrawn from the system at any time. Current price monitoring is the responsibility of each entering party.

Meanwhile, other parties are using the system to enter similar information. None of the individual entries is broadcast. Instead, the secure central station compares entries to find a synapse (or coincidence event) involving a buyer and a seller (or perhaps more than one of either) of the same item.

When a synapse occurs, all matched buyers and sellers (or their appointed agents) are informed simultaneously that a synapse has occurred. Up to this point, none of the parties knows the identity of the other party (or parties) involved. When a synapse occurs, the contra-parties (or their agents) are put in communication with one another. The transaction is then negotiated between the matched parties or their agents.

There are manifold ways to consummate a deal once interested contra-parties are matched in transactional interest. However, it is not the purpose of this system to negotiate, consummate, or execute a deal. Current mechanisms adequately allow contra-parties to consummate and, if necessary, report a transaction. This system is not an execution system. It is an information management system allowing interested parties to securely find one another prior to any negotiations leading to a transaction..

To qualify, the size must be a certain minimum based on liquidity of the stock involved (e.g., 100,000 shares). The trader also may enter an acceptable price range, and the time that the offer will remain in force.

The preceding embodiment has the following features and advantages:

1. Enable principals to anonymously enter their transactional interest in buying or selling any item into a secure centralized computer networked facility. X
2. Thereby protecting the transaction interests of any potential contra-sides to a mutually desired transaction before these interests are disclosed to either side and more importantly, without disclosing this information to anyone. Uniquely protect the transactional interests of interested contra-parties to a potential transaction prior to any disclosure of that interest;
3. Once entered, these transactional interests have the potential of being matched with natural contra-parties to their interests -- without any disclosure of these proprietary

transactional interests to any other party. Matches contra-party transactional interests in secrecy.

4. Alerts qualified parties (or their designated agents) ONLY when each has a qualified party matched on the contra-side to their transactional interest; Alerts only matched parties of a mutually desired transaction (or their agents) in confidence. Alerts qualified parties (or their designated agents) ONLY when each has a qualified party matched on the contra-side to their transactional interest. When a match occurs, the matched parties with contra-side transactional interests will be confidentially alerted & given each other's contact information according to a prior agreed upon protocol. Negotiations will then ensue directly with one another (or via agent(s)) in a traditional manner.

5. Pre-qualifies all potential participants by requiring each to make a minimum firm commitment prior to being allowed to enter a transactional interest into the system. This may entail posting a non-performance penalty bond or earnest money deposit which shall go to the contra-party to a synapse if the other party fails to perform (enter into negotiations) after a synapse.

Thus in accordance with the present invention, a system is provided that enables parties dealing in fungible commodities can seek counter-parties to their proposed transactions in a secure environment that maintains their anonymity until the prospective transaction entries of two or more parties are matched. Following the match, only the involved parties are notified. The matching or coincidence event does not determine the details of a purchase and sale, or other transaction. Instead, within the confines of price ranges or other conditions provided as part of the matching entries, the matched parties negotiate the unresolved specifics of the transaction. The anonymity prior to a match, together with standards that qualify potential users to provide prospective transaction entries to the secure station, preserve the value that inures to each party from maintaining the secrecy of its transactional interests. Parties have the flexibility to tailor their prospective transaction entries by incorporating time limits, price limits and other contingencies. Parties further are encouraged to use the system by the fact that a match of several parties does not rigidly determine all terms of the transaction, but instead sets the stage for the parties to negotiate.

CLAIMS

What is claimed is:

1. A secure system for facilitating the trading of fungible commodities, including:

a network, including a secure station and a plurality of remote user terminals having respective user identities and communicatively linked to the secure station for data transmission between the secure station and the user terminals;

a memory at the secure station for storing user data and for storing transaction data in the form of multiple prospective transaction entries received from the user terminals, each of the entries including a fungible item indication and a transaction side indication identifying one of two opposing transaction sides;

a search component operatively coupled to the memory, adapted to perform a comparison of the stored entries with respect to the fungible item indications and the transaction side indications and, based on said comparison, to select sets of two or more of the stored entries as matching entries having the same fungible item indication and together including transaction side indications identifying the opposing transaction sides;

a message sending component operatively coupled to the search component and to the memory and adapted, in response to the selection of each said set of matching entries, to generate a prospective transaction message including the transaction indication and the user identity corresponding to each of the matching entries, and further adapted to provide the prospective transaction message to the user terminals associated with said corresponding user identities, thus to facilitate an interaction among users associated with the user terminals to complete a transaction involving the fungible item; and

a data security component for restricting access to any given prospective transaction entry stored in the memory to (i) the user identity corresponding to the given entry; and (ii) the user identities corresponding to the other entries in any of said sets of entries that includes the given entry.

2. The system of claim 1 wherein:

said message sending component provides the prospective transaction message substantially simultaneously to the user terminals associated with said corresponding user identities.

3. The system of claim 1 further including:

a menu for enabling users to select fungible item indications corresponding to different types of fungible items.

4. The system of claim 3 wherein:

said menu is stored in the memory.

5. The system of claim 1 wherein:

the data security component includes a plurality of user pages maintained at the secure station, each of the user pages being associated with and accessible only by one of the users.

6. The system of claim 1 wherein:

each of the prospective transaction entries includes a further indication selected from a group of further indications consisting of:

an amount indication designating an amount of the fungible item corresponding to the fungible item indication; a price indication designating an acceptable price or an acceptable price range; and a time limit indication.

7. The system of claim 6 wherein the further indication is an amount indication, and further includes:

an apportionment component, responsive to the selection of a set of matching entries that includes at least two entries having the same transaction side, for apportioning the designated amount of the fungible item among the user identities corresponding to the given transaction side.

8. The system of claim 6 wherein:

the memory includes an active segment for storing prospective transaction entries with none of said further indications and for storing entries including further indications that

are satisfied; and a suspended segment for storing prospective transaction entries including a further indication which is not satisfied;

wherein the secure station further includes an entry monitoring component operatively associated with the active and suspended segments, for repeatedly monitoring the entries that include a further indication, to determine whether that further indication is satisfied; and

wherein said search component performs said comparison only upon the entries stored in the active segment of the memory.

9. The system of claim 8 wherein:

the memory further includes a pending segment for storing prospective transaction entries designated as pending by the corresponding users, and a means for shifting an entry from the pending segment to the active segment responsive to a signal from the corresponding user terminal activating the entry.

10. The system of claim 1 further including:

a status designation component enabling each user to alternatively designate a prospective transaction entry as active or pending;

wherein the memory includes an active memory segment for storing entries designated active, and an inactive segment for storing entries designated as pending; and

means for transferring an entry from one of said segments to the other in response to a change in the designation.

11. A process for facilitating the trading of fungible commodities, including:

receiving, from a plurality of remote user locations, user information including user identities, and transaction information in the form of prospective transaction entries, each of the entries including a fungible item indication and a transaction side indication identifying one of two opposing transaction sides;

storing the user information and the prospective transaction entries to a memory;

searching the memory to perform a comparison of the stored entries with respect to the fungible item indications and the transaction side indications;

based on said comparison, selecting matching entries to form sets of two or more of the matching entries having the same fungible item indication and together including transaction side indications identifying the opposing transaction sides;

in response to selecting each of the sets of entries, generating a prospective transaction message including the transaction indication and user identity corresponding to each of the matching entries, and providing the prospective transaction message to the user locations associated with the corresponding user identities, thereby to enable the associated users to contact one another toward a completion of a transaction involving the fungible item; and

restricting access to any given prospective transaction entry to (i) the user identity corresponding to the given entry; and (ii) the user identities corresponding to the other entries in any of said sets of entries that includes the given entry.

12. The process of claim 11 wherein:

said providing the prospective transaction message includes providing said message substantially simultaneously to the user terminals associated with the corresponding user identities.

13. The process of claim 11 further including:

prior to receiving the prospective transaction entries from a given user, authorizing the given user based on the given user's meeting of predetermined qualification requirements.

14. The process of claim 11 wherein:

said restricting access includes maintaining at the secure location a plurality of user pages, each user page personalized to and accessible only by an associated one of the user locations.

15. The process of claim 11 wherein each of the prospective transition entries further optionally includes a condition, and the process further includes:

identifying the prospective transaction entries that includes a condition, and monitoring each of the entries so identified to determine whether the associated condition is satisfied.

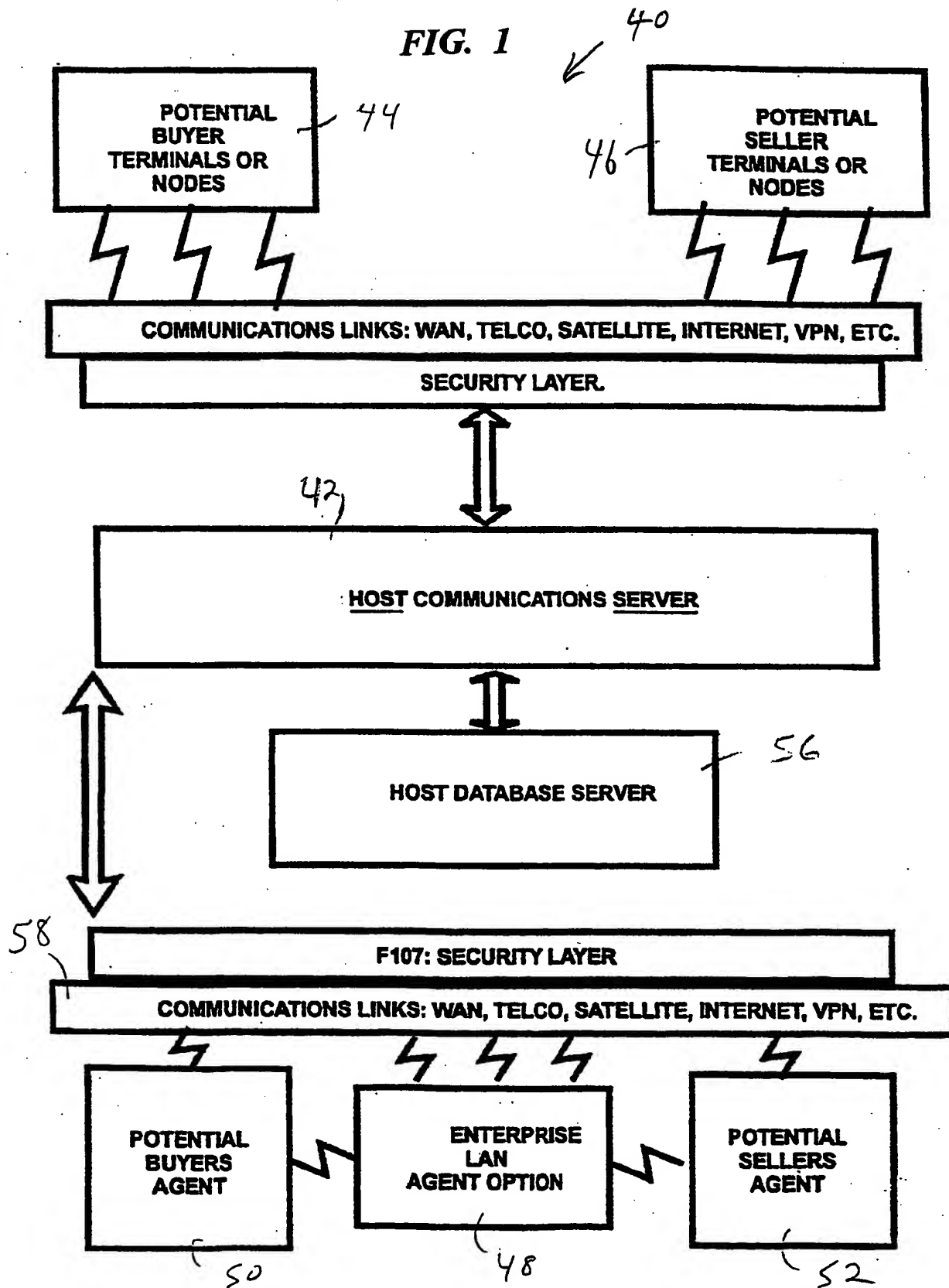
16. The process of claim 11 wherein:

at least a portion of the prospective transaction entries include an amount indication associated with the fungible item indication, and the process further includes:

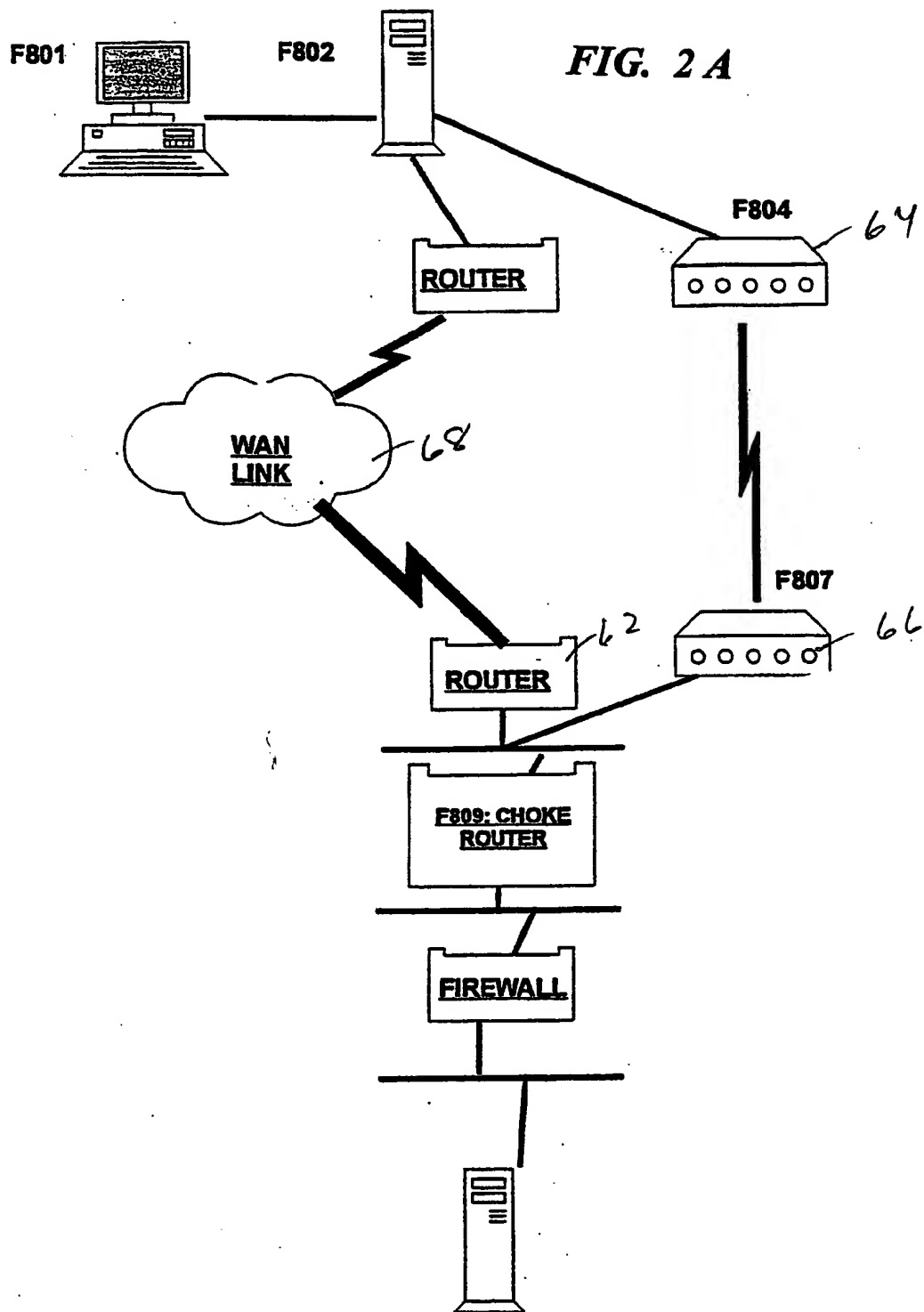
responsive to the selection of a set that includes at least two entries with the same transaction side indication, apportioning the fungible item among the users indicating said same side of the transaction.

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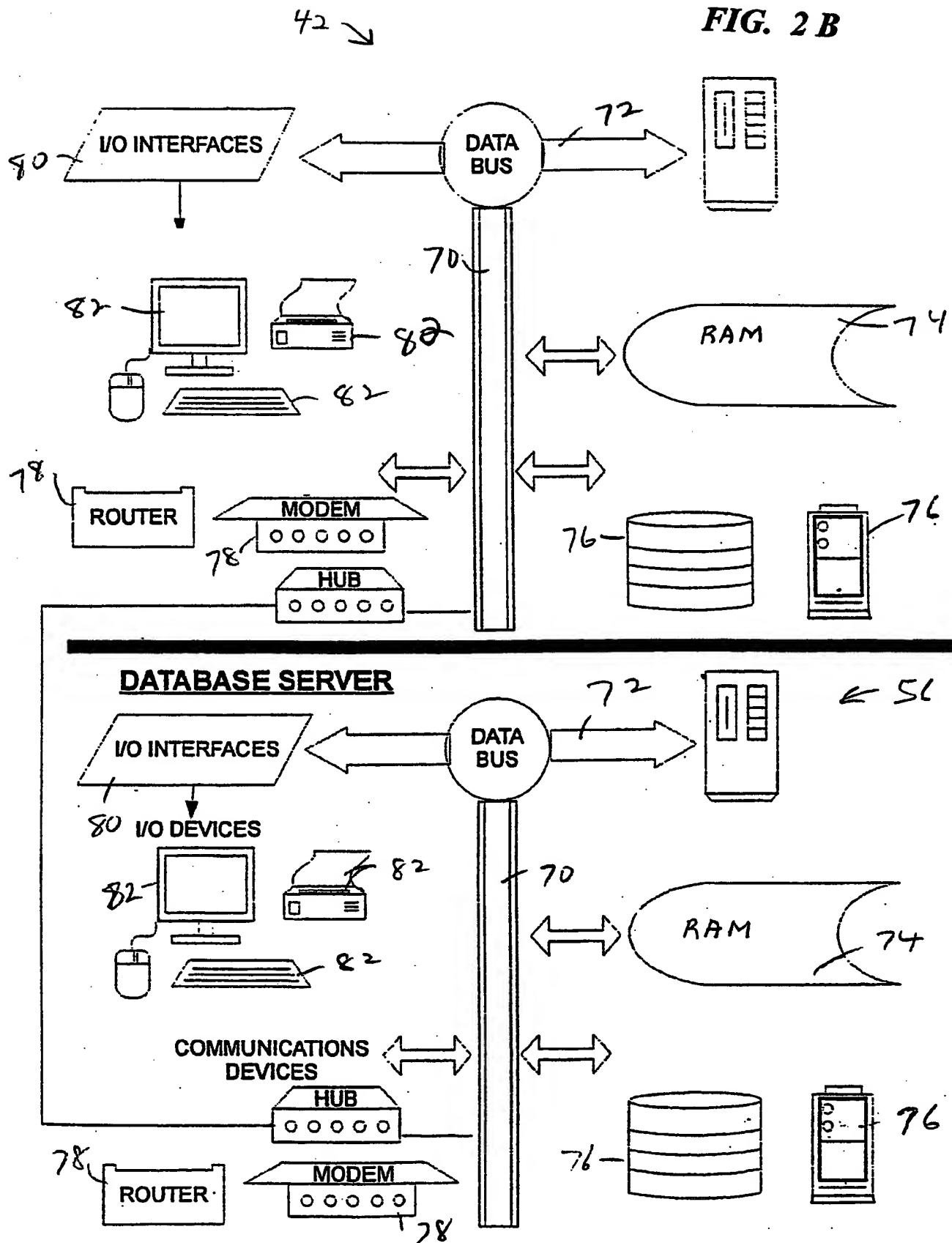
FIG. 1



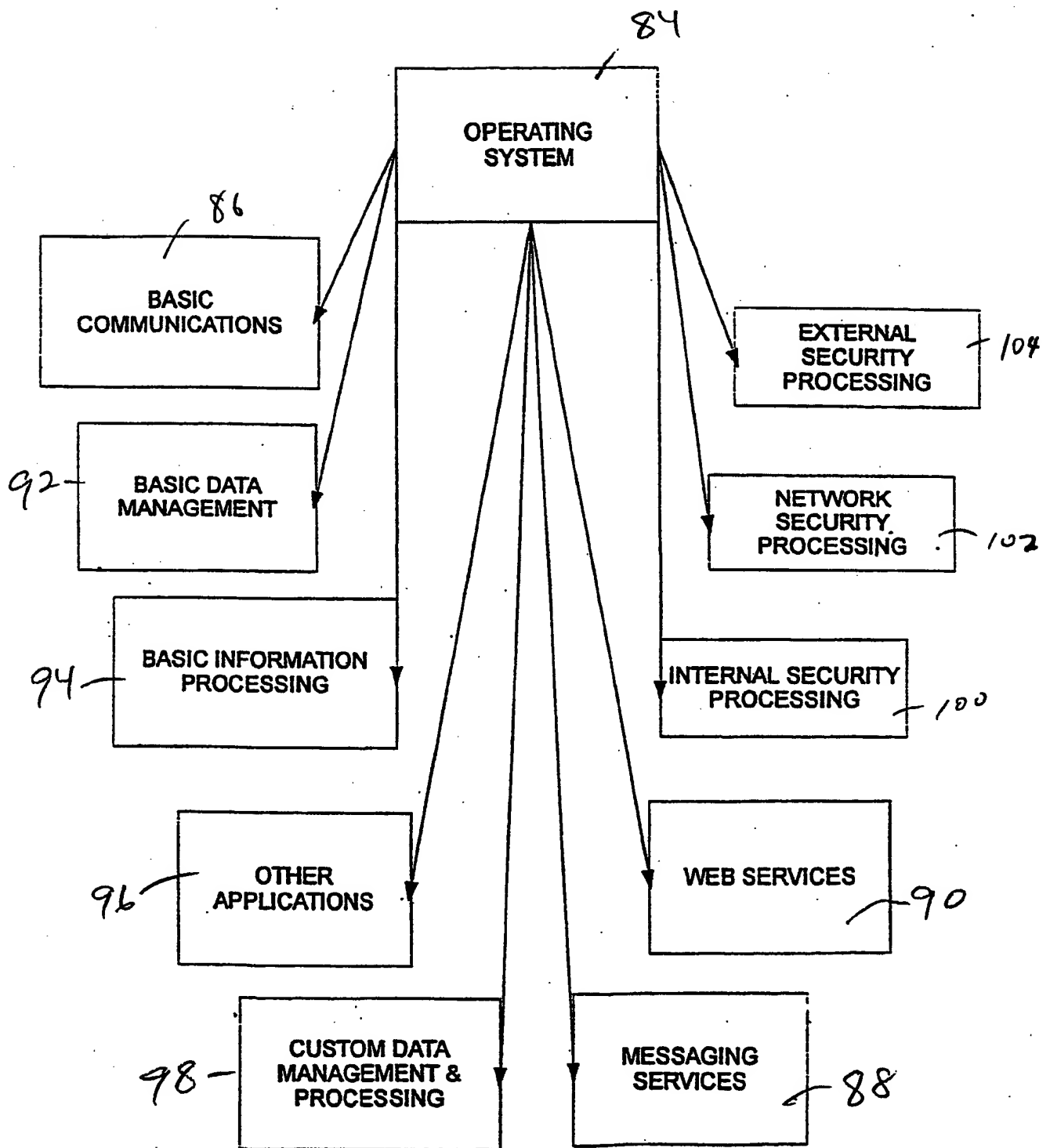
2/17



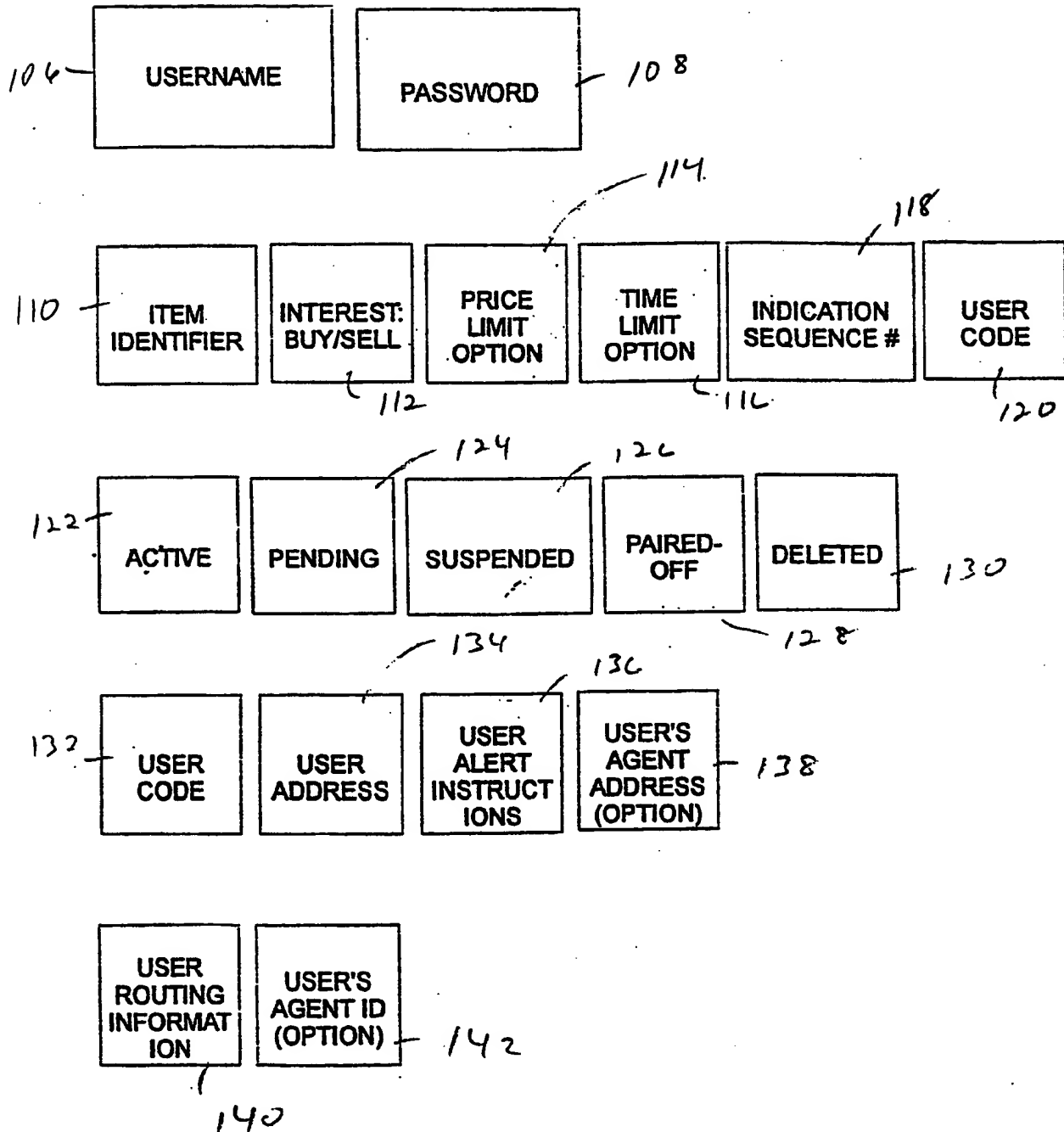
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FIG. 2 B

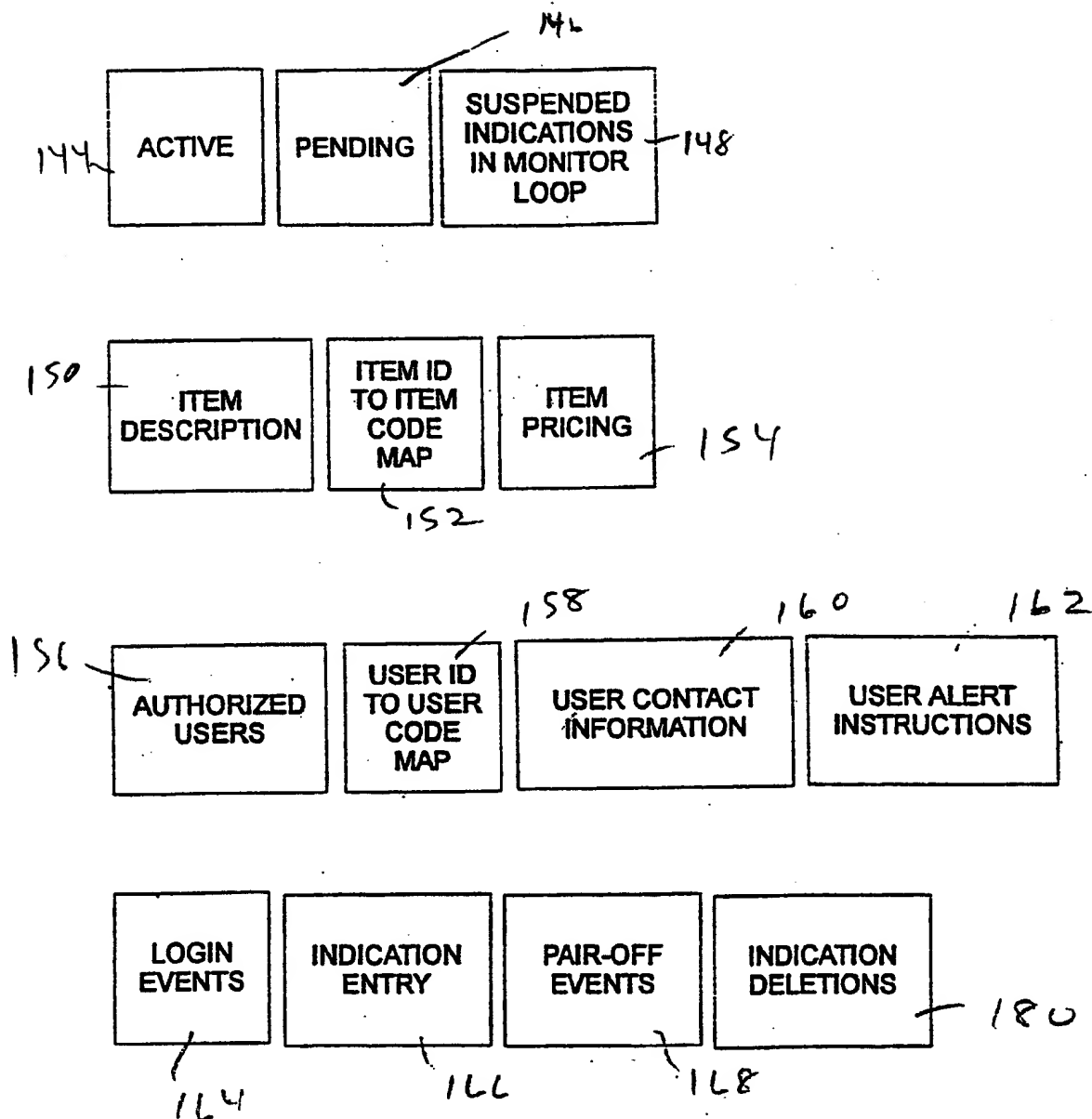
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FIG. 3

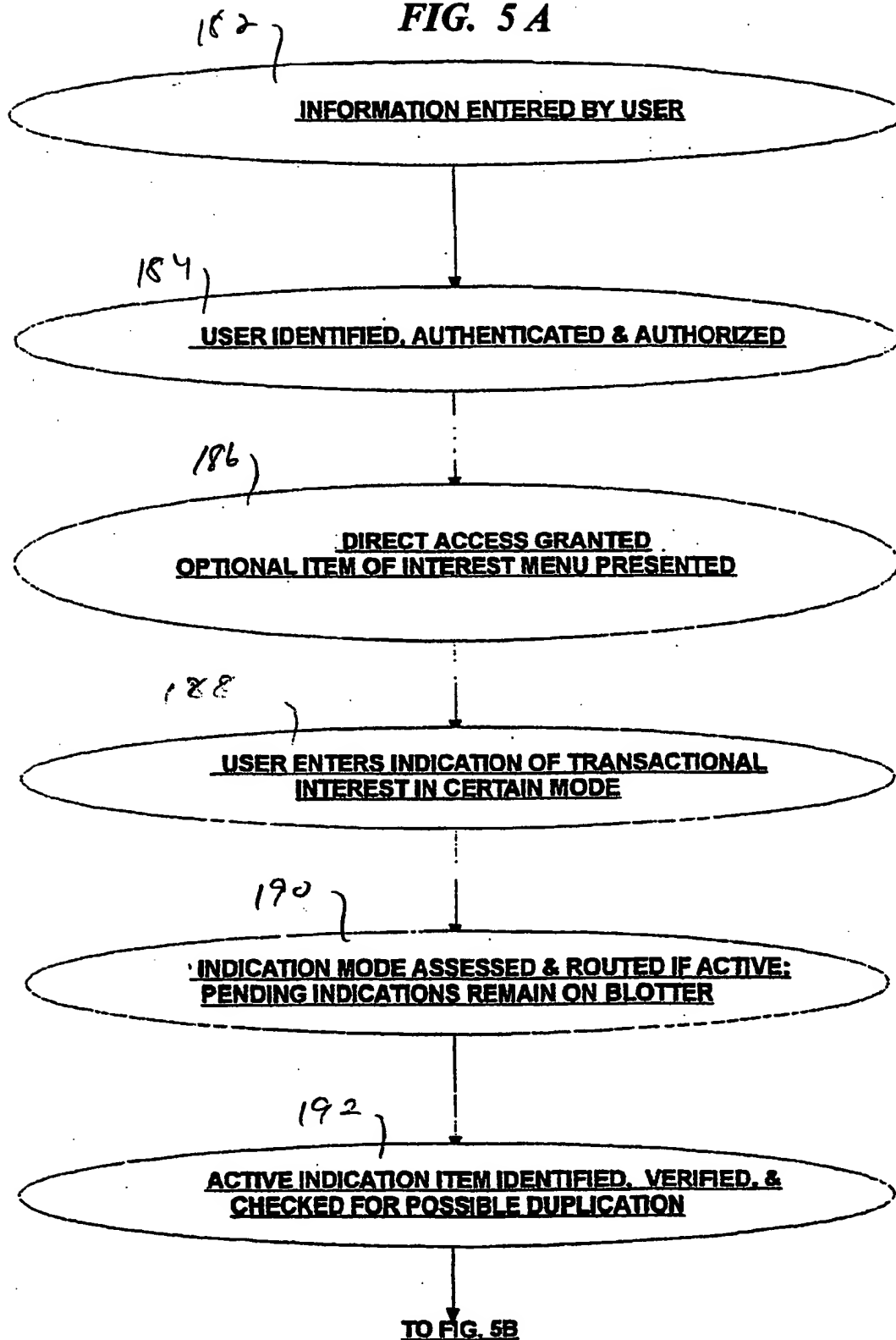
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FIG. 4 A

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FIG. 4 B

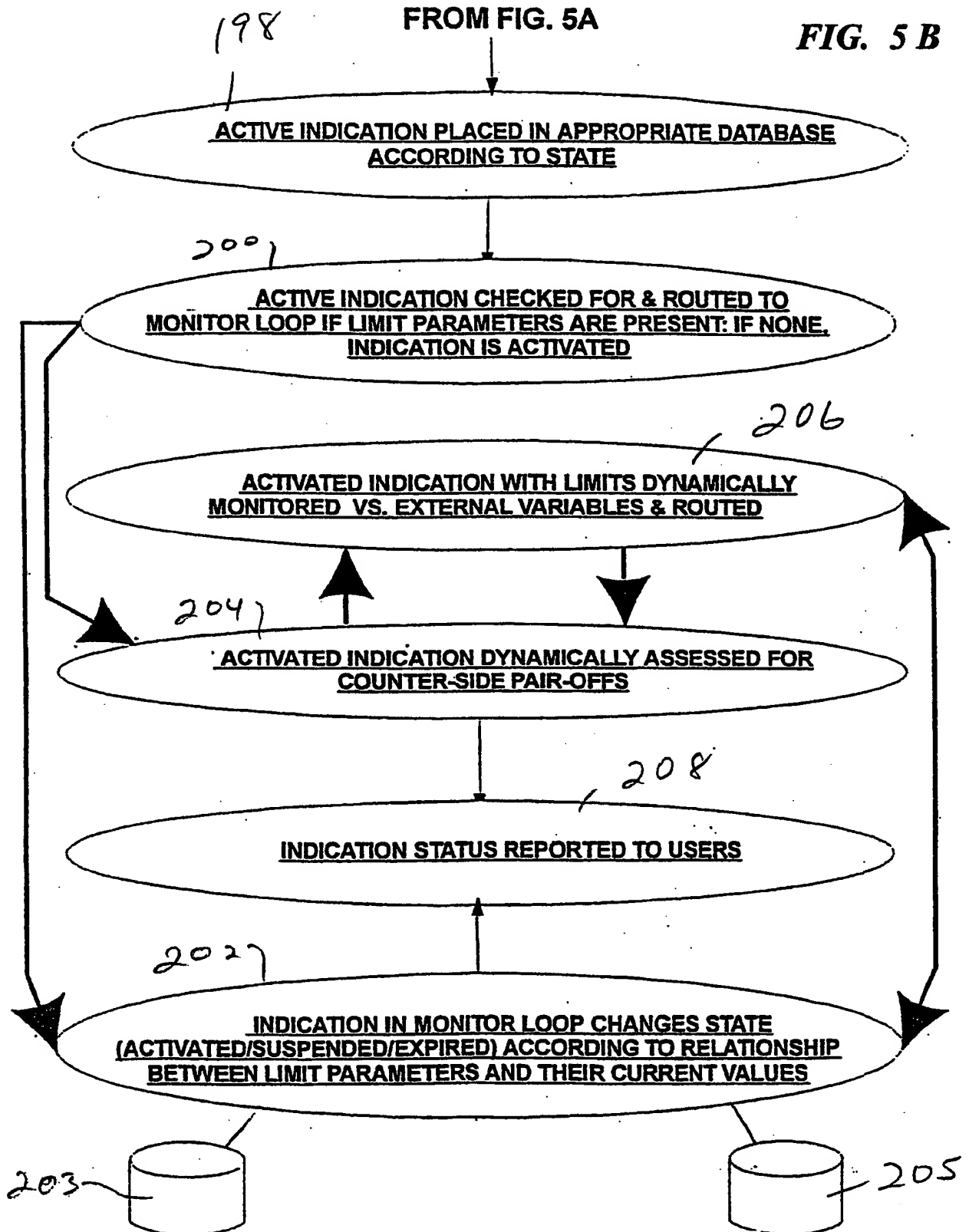
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FIG. 5 A

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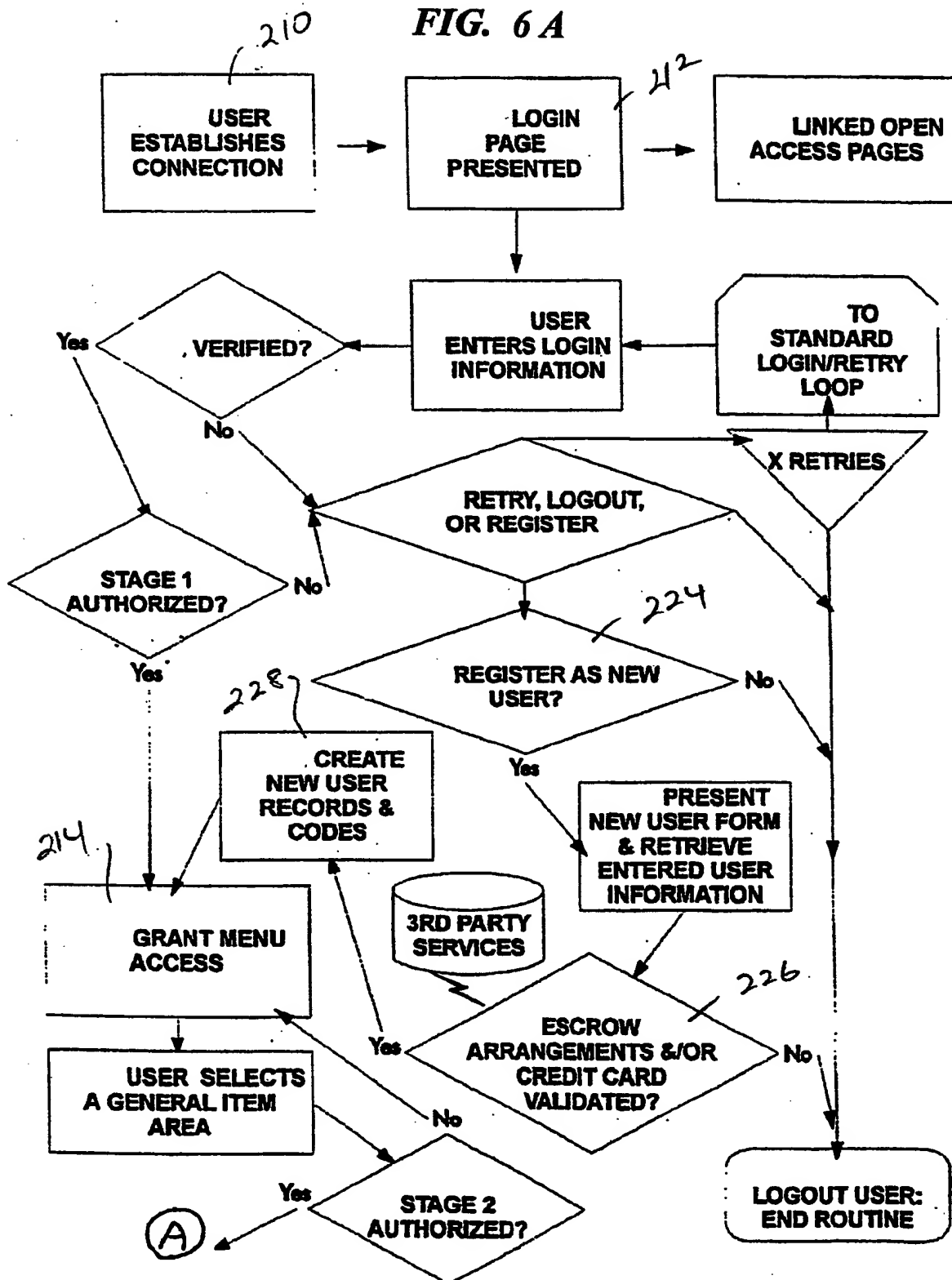
FROM FIG. 5A

FIG. 5B



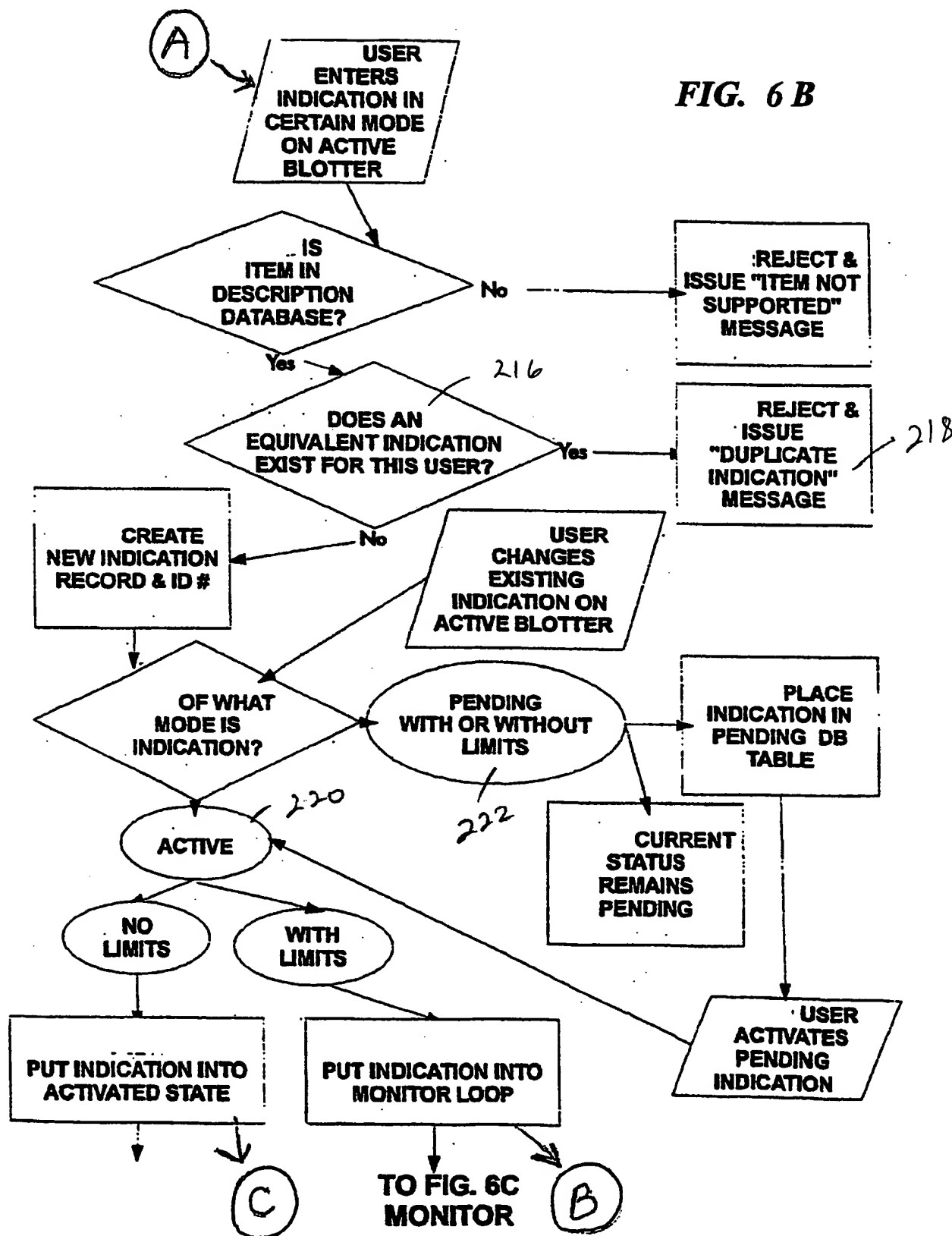
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FIG. 6A



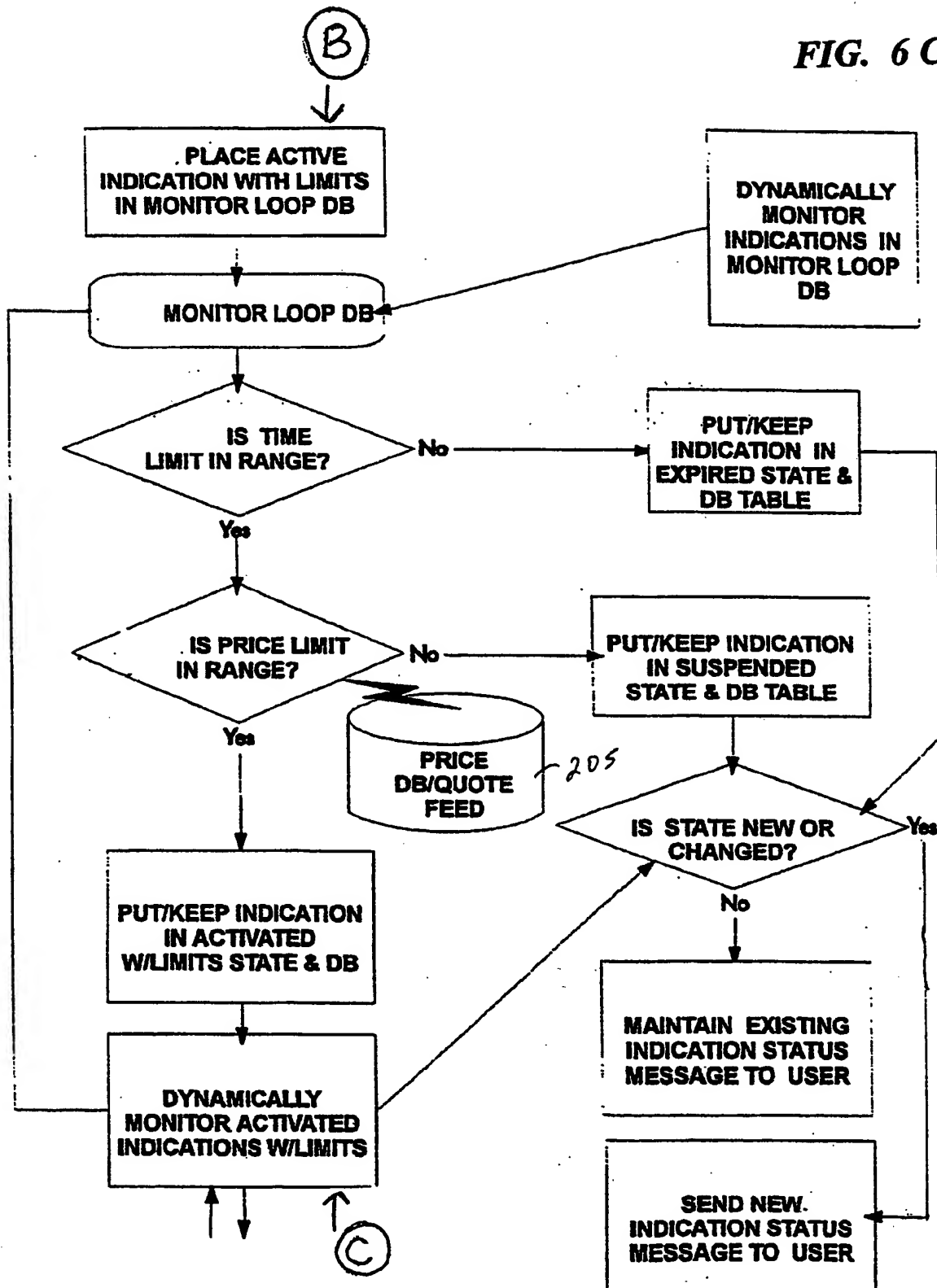
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FIG. 6B

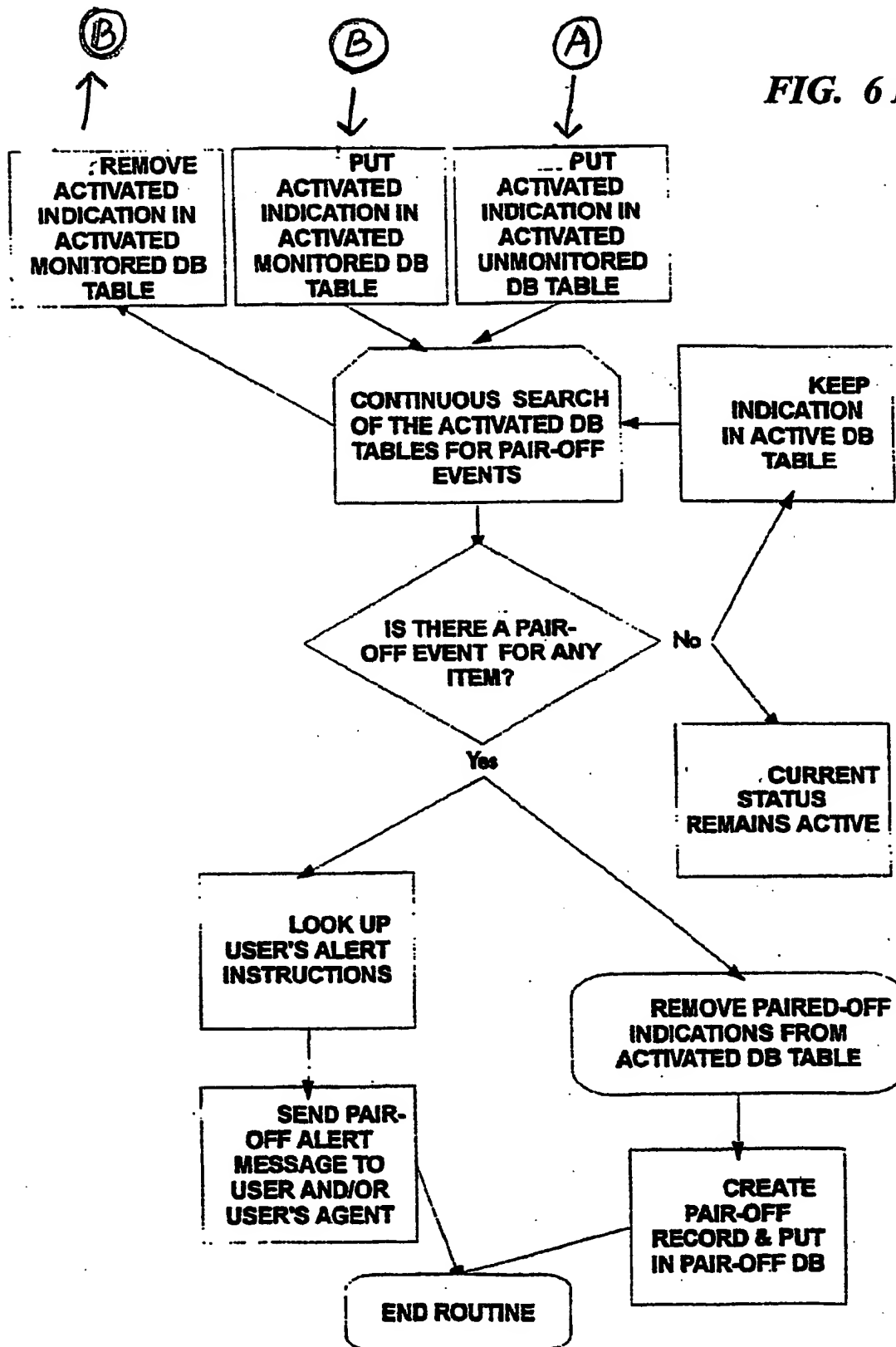


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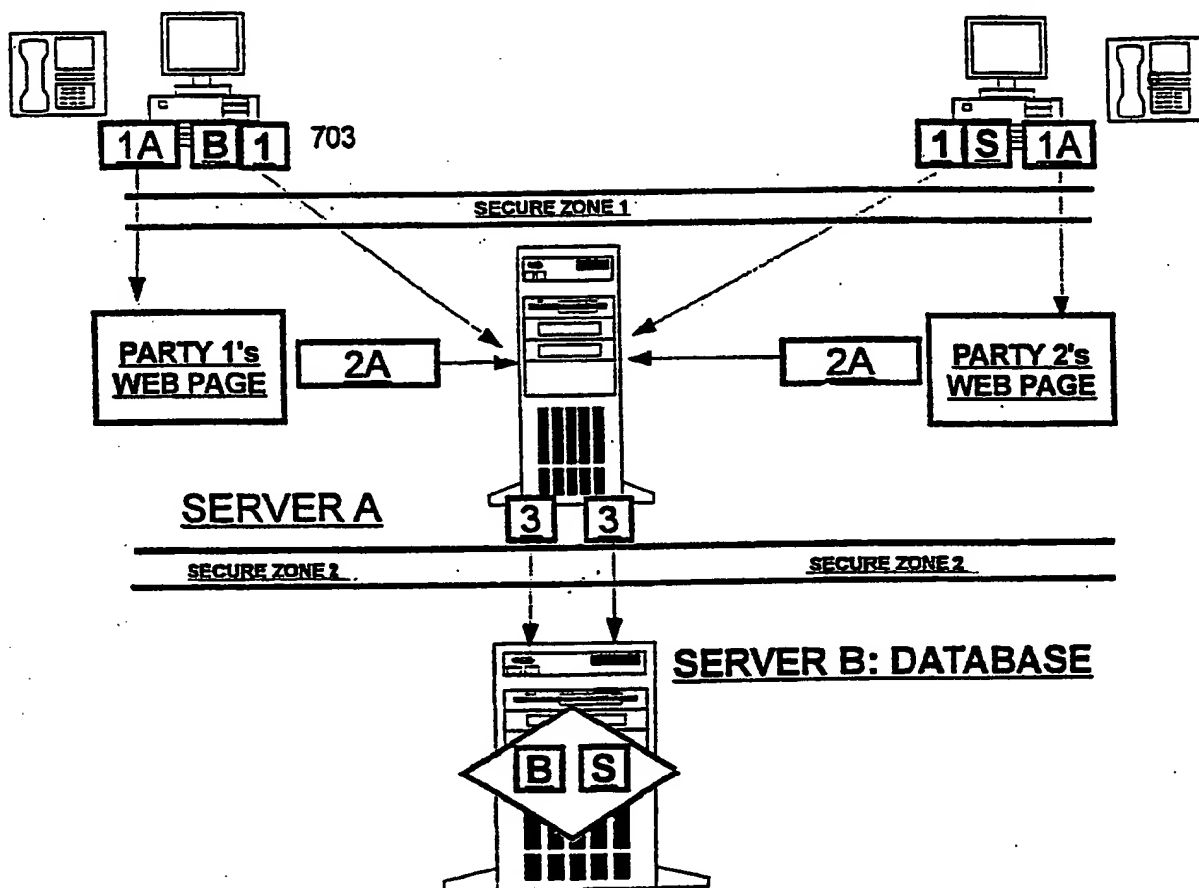
FIG. 6C



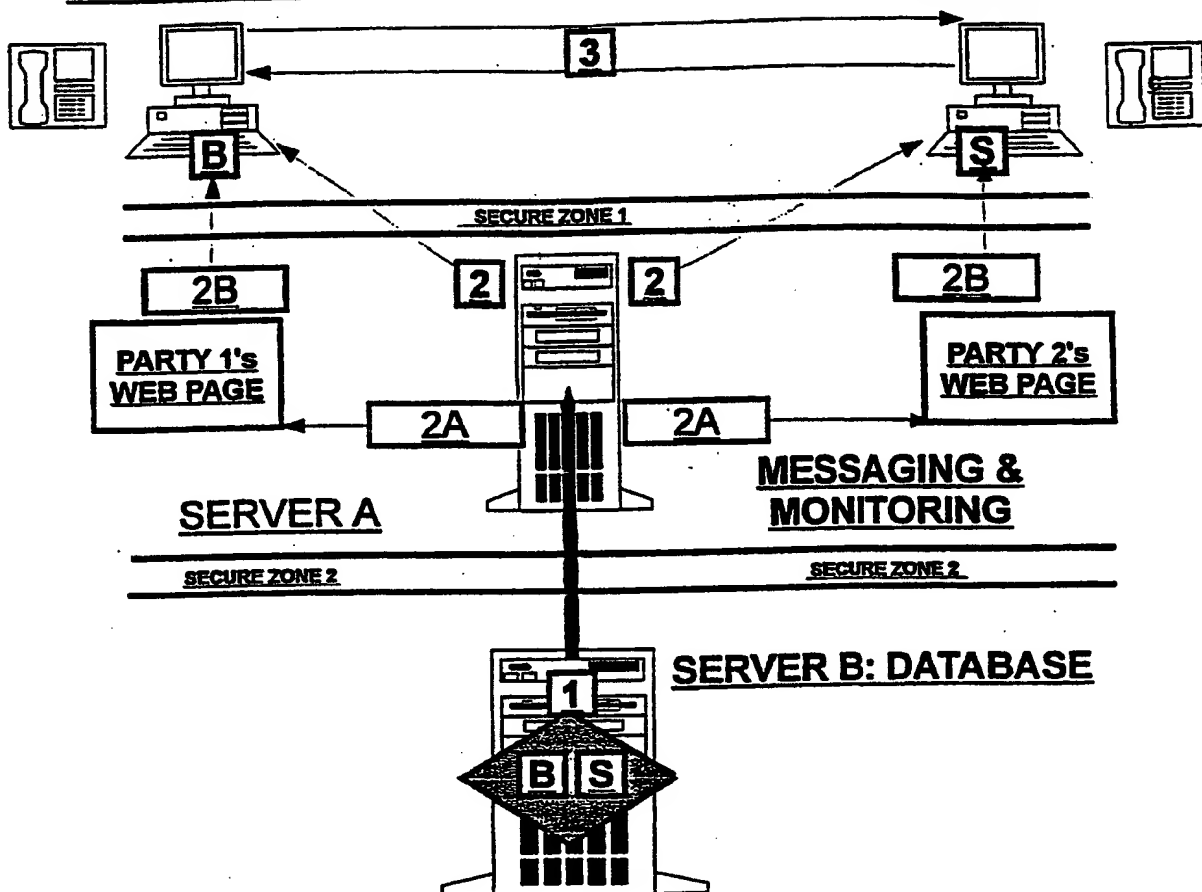
12/17



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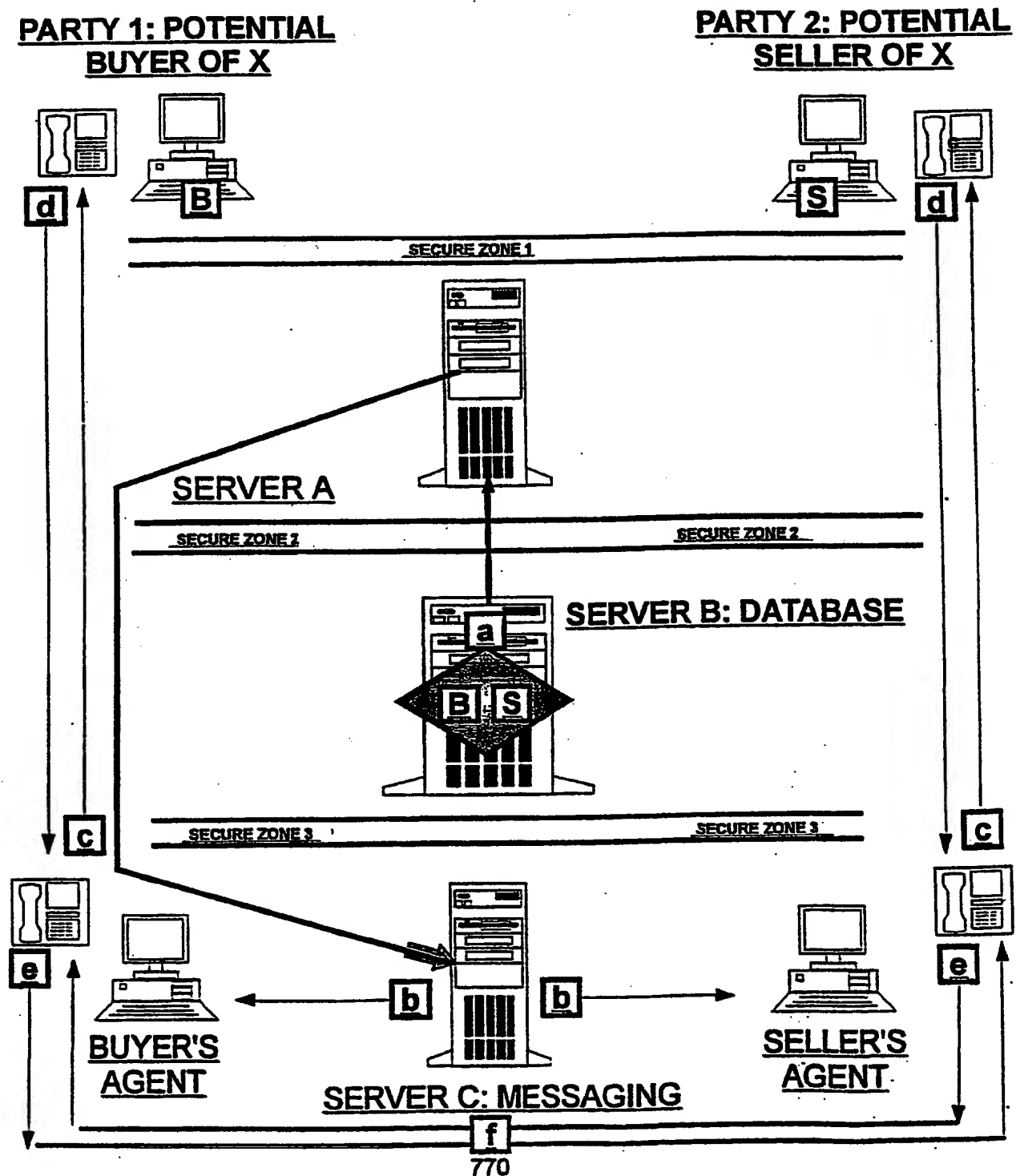
FIG. 7A**PARTY 1: POTENTIAL
BUYER OF X****PARTY 2: POTENTIAL
SELLER OF X**

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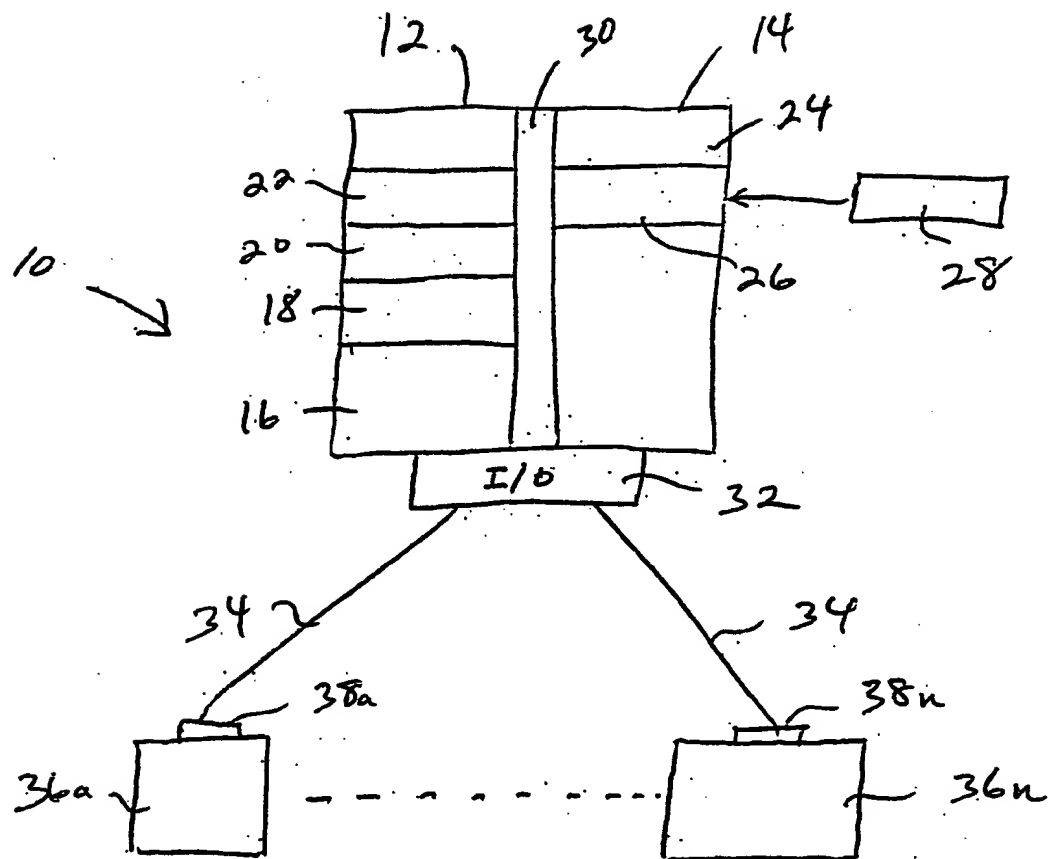
FIG. 7 B**PARTY 1: POTENTIAL
BUYER OF X****PARTY 2: POTENTIAL
SELLER OF X**

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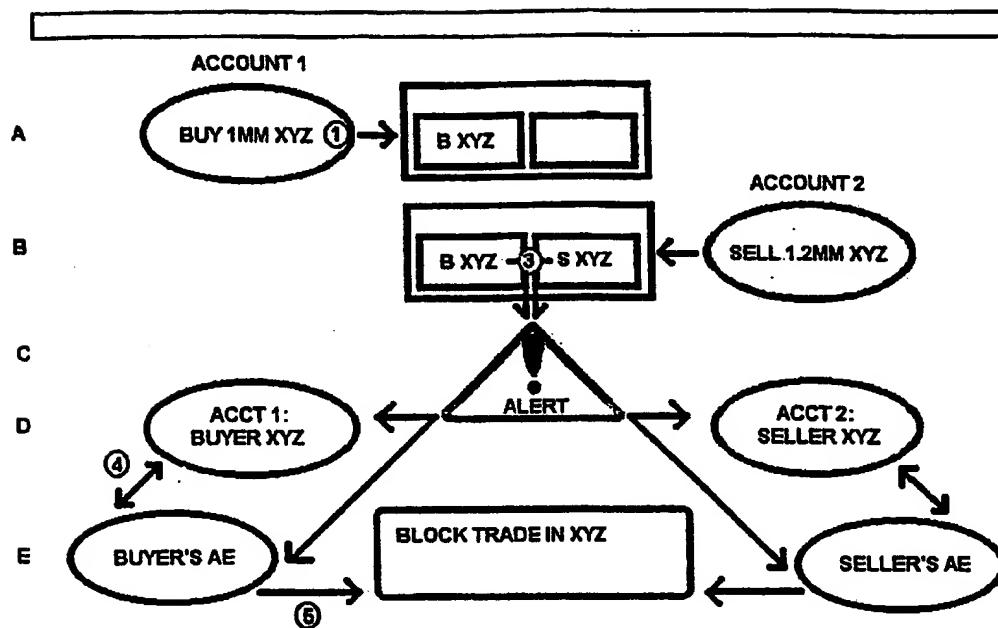
FIG. 7C



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**FIG. 8**

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**FIG. 9**

INTERNATIONAL SEARCH REPORT

International application No.

PCT/US00/12918

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G06F 17/60

US CL :705/37

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/37

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
NONEElectronic data base consulted during the international search (name of data base and, where practicable, search terms used)
WEST, DIALOG**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5,727,165 A (ORDISH et al) 10 March 1998, col. 5, line 27 thru col. 8, line 67.	1-16
X	US 5,835,087 A (HERZ et al) 10 November 1998, col. 34, line 48 thru col. 48, line 26.	1-16
X,P	US 6,029,195 A (HERZ) 22 February 2000, col. 41, line 21 thru col. 55, line 23.	1-16
X,P	US 6,014,627 A (TOGHER et al) 11 January 2000, col. 2, line 15 thru col. 7, line 65.	1-16
A,P	US 6,012,046 A (LUPIEN et al) 04 January 2000, entire document.	1-16
A	US 5,689,652 A (LUPIEN et al) 18 November 1997, entire document.	1-16

☐ Further documents are listed in the continuation of Box C.
 ☐ See patent family annex.

* Special categories of cited documents:	*T* later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
A document defining the general state of the art which is not considered to be of particular relevance	*X* document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
E earlier document published on or after the international filing date	*Y* document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
L document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	*A* document member of the same patent family
O document referring to an oral disclosure, use, exhibition or other means	
P document published prior to the international filing date but later than the priority date claimed	

Date of the actual completion of the international search

10 AUGUST 2000

Date of mailing of the international search report

28 AUG 2000

 Name and mailing address of the ISA/US
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